

FENCE ASSEMBLY

BACKGROUND OF THE INVENTION

The invention relates to a fence assembly employing tubular members
5 received over fence posts (i.e. T-posts) and braces removably connected to
and between pairs of tubular members.

Standard fencing for farms and ranches uses metal T-posts that are
driven into the ground, and barbed wire stretched between the T-posts.
However, certain posts for this type of fence, such as corner posts or gate
10 posts, must provide extra strength and stability. These posts are
typically large in diameter (i.e. 6 inches), and require an appropriate
sized post hole that is dug to a depth sufficient to provide the necessary
stability. Cement is sometimes poured in the hole around the post.
Consequently, installation of such posts is a time consuming and labor
15 intensive operation.

SUMMARY OF THE INVENTION

According to one aspect of the invention there is provided a fence
assembly comprising: a first fence post extending upwardly from the ground;
20 a first tubular member having a first upper end and a first lower end, the
first tubular member being received over but not connected to the first
fence post such that the first lower end rests upon the ground; a first lug
laterally extending from the first tubular member; a second fence post
extending upwardly from the ground; a second tubular member having a second
25 upper end and a second lower end, the second tubular member being received
over but not connected to the second fence post such that the second lower
end rests upon the ground; a second lug laterally extending from the second
tubular member; a brace having opposing ends; a first connection means for
removably connecting one end of the brace to the first lug; and a second
30 connection means for removably connecting the other end of the brace to the
second lug.

In a preferred embodiment hereafter described, each fence post is a T-post driven into the ground in the usual manner, the second tubular member is shorter in length than the first tubular member, and a second brace is removably connected between additional lugs on the tubular members. Most preferably, third and fourth braces are connected between the first tubular member and a third tubular member that is similar to the second tubular member. The first tubular member, as received over the first fence post and braced as described, can serve as a corner post, gate post, or in other applications described further below.

10 Assembly of the various components is quick and easy. No time consuming post hole digging is required, and common bolts and nuts can be employed to connect the ends of the braces to respective lugs. In accordance with the preferred embodiment, a connector at each end of a brace is longitudinally adjustable and allows for a pivotal connection
15 between the connector and a lug, thereby making the fence assembly even more user friendly, particularly when installed on uneven terrain.

 According to another aspect of the invention, there is provided a combination comprising: a tubular member having a longitudinal axis and opposing first and second ends; a first sleeve rotatably connected to the
20 tubular member so as to be rotatable about but not movable along the longitudinal axis, the first sleeve being more closely adjacent to the first end than the second end; a pair of transversely opposed and apertured first lugs integrally connected to and laterally extending from the first sleeve; a second sleeve rotatably connected to the tubular member so as to
25 be rotatable about but not movable along the longitudinal axis, the second sleeve being more closely adjacent to the second end than the first end; a pair of transversely opposed and apertured second lugs integrally connected to and laterally extending from the second sleeve; a pair of transversely opposed and apertured third lugs integrally connected to and laterally
30 extending from the tubular member adjacent to the first sleeve and associated first lugs, the third lugs thereby also being more closely adjacent to the first end than the second end; and a pair of transversely

opposed and apertured fourth lugs integrally connected to and laterally extending from the tubular member adjacent to the second sleeve and associated second lugs, the fourth lugs thereby also being more closely adjacent to the second end than the first end.

5 The above-mentioned tubular member, as received over a standard fence post (i.e. T-post), can serve as a corner post, gate post, etc. in the manner previously described. The apertured lugs can receive bolts or other fasteners therethrough for connecting braces to the lugs. The two pairs of transversely opposed lugs near each end of the tubular member
10 allow for connection of some or all of the lugs to corresponding braces in the assembly of almost any fencing configuration. Finally, the rotatable sleeves and associated lugs permit adjustment of the angular relationship between such lugs and those lugs integrally connected to the tubular member, and thereby also between braces connected to corresponding lugs.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a tubular member having sleeves rotatably and integrally connected thereto, with pairs of lugs integrally connected to respective sleeves.

20 FIG. 2 is a top view of the combination of FIG. 1 as viewed along line 2-2.

FIG. 3 is a cross-sectional view of the combination of FIG. 1 as viewed along line 3-3.

FIG. 4 is a side view of a tubular member shorter in length than the
25 tubular member of FIG. 1 and having a pair of lugs integrally connected thereto.

FIG. 5 is a top view of the tubular member and associated lugs of FIG. 4 as viewed along line 5-5.

FIGS. 6 and 7 are different views of a brace and associated
30 connectors at each end.

FIG. 8 is a perspective view of one embodiment of a fence assembly in accordance with the invention.

FIG. 9 is a view of one end of a brace in FIG. 8, as viewed along line 9-9, as removably connected with a connector to a lug of a tubular member.

FIG. 10 shows the manner in which a gate can be pivotally connected to lugs extending from the tubular member of FIG. 1, with the aid of novel brackets received over the lugs.

DESCRIPTION OF A PREFERRED EMBODIMENT

Some terms, as used in the following description and in the appended claims, will now be defined.

A "T-post" is defined as a fence post having elongated perpendicular legs and a transverse T-shaped cross section.

With regard to "integrally connected" members, this means that the members are fixedly connected to one another (i.e. by welding) or are integral with one another.

The term "apertured" as applied to any member (i.e. lug or connector) means that the member has at least one aperture.

Referring to FIG. 1, tubular member 10 has a longitudinal axis 12 and opposing upper and lower ends which are open. A pair of transversely opposed and apertured lugs 14 are integrally connected to and laterally extend from a sleeve 16, which is integrally connected to tubular 10. Therefore, lugs 14 are integrally connected to and laterally extend from tubular member 10 by means of sleeve 16. Ring 18 is also integrally connected to tubular member 10. A sleeve 20 is rotatably connected to tubular member 10, and is closely received between sleeve 16 and ring 18 so as to be rotatable about but not movable along longitudinal axis 12. Accordingly, sleeve 16 and ring 18 act as a bearing means for sleeve 20. A pair of transversely opposed and apertured lugs 22 are integrally connected to and laterally extend from sleeve 20, thereby being adjacent to but longitudinally offset from lugs 14. As shown, sleeves 16 and 20, and associated respective lugs 14 and 22, are more closely adjacent to the upper end than the lower end of tubular member 10.

Sleeves 24 and 26, and associated respective lugs 28 and 30, are similar to sleeves 16 and 20 and associated respective lugs 14 and 22, except for being more closely adjacent to the lower end than the upper end of tubular member 10. The pair of transversely opposed and apertured lugs 28 are integrally connected to and laterally extend from sleeve 24, which is integrally connected to tubular 10. Therefore, lugs 28 are integrally connected to and laterally extend from tubular member 10 by means of sleeve 24. Ring 32 is also integrally connected to tubular member 10. Sleeve 26 is rotatably connected to tubular member 10, and is closely received between sleeve 24 and ring 32 so as to be rotatable about but not movable along longitudinal axis 12. Accordingly, sleeve 24 and ring 32 act as a bearing means for sleeve 26. A pair of transversely opposed and apertured lugs 30 are integrally connected to and laterally extend from sleeve 26, thereby being adjacent to but longitudinally offset from lugs 28.

Referring to FIG. 2, this top view shows welds 34 that integrally connect sleeve 16 to tubular member 10, as well as lugs 14 laterally extending from sleeve 16. Tubular member 10 is coaxial with sleeve 16.

Referring to FIG. 3, this cross-sectional view shows coaxial tubular member 10 and sleeve 20, as well as lugs 22 laterally extending from sleeve 20. Each lug 22 (as well as each of the other lugs) is preferably comprised of square tube stock, and has a pair of aligned apertures 36 and 38 through opposing side walls of the lug. As discussed above, sleeve 20 is rotatable with respect to tubular member 10. Accordingly, sleeve 20 and associated lugs 22 can be rotated to any desired rotational position, such as a 90° rotation from that position in solid lines to that position shown in phantom lines.

Of course, all features discussed with reference to FIGS. 2 and 3, in regard to sleeves 16 and 20 and associated respective lugs 14 and 22, also apply to sleeves 24 and 26 and associated lugs 28 and 30.

Referring to FIG. 4, tubular member 40 preferably has a diameter similar to tubular member 10, but is shorter in length than tubular member 10. Tubular member 40 has opposing upper and lower ends which are open. A

pair of lugs 42, having the same structure as the lugs associated with the sleeves of tubular member 10, are integrally connected to and laterally extend from tubular member 40. In addition, lugs 42 are longitudinally offset from one another and approximately coplanar.

5 Referring to FIG. 5, this top view shows tubular member 40 and the upper lug 42 laterally extending therefrom.

Referring to FIG. 6, brace 44 has a longitudinal axis 45 and preferably comprises a tubular body 46 and opposing, internally threaded ends 48 and 50, most conveniently formed by nuts integrally connected to the tubular body. A first connector 52 has a forked end portion 54 and an opposing, elongated end portion 56 that is threaded. End portion 56 is threadedly received by end 48 of brace 44. The wall of a portion of tubular body 46 is broken away to reveal a part of end portion 56 received inside the tubular body. A second connector 58 is similar to connector 52 in having a forked end portion 60 and an opposing, elongated end portion 62 that is threaded. End portion 62 is threadedly received by end 50 of brace 44. The position of each connector relative to the corresponding end of brace 44 is longitudinally adjustable by rotation of the connector while brace 44 remains fixed, or by rotation of brace 44 while the connector remains rotationally fixed. FIG. 6 further shows that end portions 56 and 62 are oppositely threaded. This feature allows longitudinal adjustment with respect to both connectors simultaneously by rotation of brace 44 while both connectors remain rotationally fixed. After completion of any longitudinal adjustment, nuts 64 and 66 (as threadedly received on respective end portions 56 and 62) can be tightened against ends 48 and 50 of brace 44.

Referring to FIG. 7, this view of brace 44 and associated connectors 52 and 58 shows one of two aligned apertures 68 in end portion 54, and also shows one of two aligned apertures 70 in end portion 60. End portions 54 and 60 will sometimes be referred to hereafter as apertured end portions.

It will be apparent from FIG. 8 and the following discussion that the length of brace 44 will depend upon whether it will be used to extend

straight across between tubular members or between upper and lower positions (i.e. diagonal).

Referring to FIG. 8, the illustrated fence assembly includes fence posts 72, 74, and 76 extending upwardly from the ground 78. Each of the fence posts is preferably a T-post. Tubular member 10 is received over but not connected to fence post 72 such the lower end of tubular member 10 rests upon the ground. Tubular members 40a and 40b are respectively received over fence posts 74 and 76 such that the lower ends of such tubular members also rest upon the ground. The fence posts and associated tubular members are arranged in a corner post configuration in the embodiment of FIG. 8. As shown, sleeves 20 and 26 are rotationally positioned such that lugs 22 and 30 are substantially perpendicular to lugs 14 and 28. Of course, sleeves 20 and 26 can be rotated to position lugs 22 and 30 in any desired angular relationship to lugs 14 and 28. Lugs 42a are shown as being adjacent to a line 80 defined by the lower end of tubular member 40a and the lower end of tubular member 10. Similarly, lugs 42b are adjacent to a line 82 defined by the lower end of tubular member 40b and the lower end of tubular member 10.

Brace 44a has one end removably connected to one of lugs 22 and the other end removably connected to the upper lug 42a. Brace 44b has one end removably connected to one of lugs 30 and the other end removably connected to the lower lug 42a. Brace 44c has one end removably connected to one of lugs 14 and the other lug removably connected to the upper lug 42b. Brace 44d has one end removably connected to one of lugs 28 and the other end removably connected to the lower lug 42b. The latter removable connection is shown in FIG. 9, and is understood to be representative of the other above-mentioned connections.

Referring to FIG. 9, fence post 76 (a T-post) and tubular member 40b are shown in cross section. Lower lug 42b laterally extends from tubular member 40b. The shaft of a bolt 84 is received through aligned apertures (see FIGS. 4 and 7) of lower lug 42b and end portion 54 of connector 52. A nut 86 is threadably received on the end of bolt 84 to secure the bolt in

place. A pivotal and removable connection of end portion 54 to lower lug 42b is thereby provided. Also shown in FIG. 9 is end portion 56 of connector 52 as threadedly received by end 48 of brace 44d. Nut 64 is tightened against end 48 to thereby serve as a jam nut.

5 Installation of the fence assembly is quick and easy, even on uneven terrain. The fence posts (T-posts) are first driven into the ground in the usual manner at locations approximated by the installer. The tubular members are then slipped over corresponding fence posts. To install a brace, the installer can hold the brace and rotate one or both of the
10 opposing connectors to approximate the desired distance between their apertured end portions. The apertured end portion of one connector is then connected to a first lug with a bolt and nut. The brace is pivoted to the appropriate height and rotated in the appropriate direction until the apertures of the apertured end portion of the other connector are aligned
15 with the apertures of a second lug. A bolt is passed through the aligned apertures and a nut threaded onto the bolt to connect the latter mentioned apertured end portion to the second lug. Final adjustments can be made by rotating the brace (i.e. with a pipe wrench) in the appropriate direction, as is made possible with the opposite threads of the connectors discussed
20 above.

 Although the fence assembly has been illustrated and described in terms of a corner post configuration, many other configurations are possible in accordance with the invention, including but not limited to: linear alignment of the fence posts and their corresponding tubular
25 members; addition of another fence post and tubular member to form a configuration in the shape of a "T"; and addition of yet another fence post and tubular member to form a cross-fence configuration, in which case all lugs associated with sleeves of tubular member 10 would be used. In any configuration, wire (not shown) in a finished fence can simply be wrapped
30 around tubular member 10 to secure the wire thereto.

 Referring to FIG. 10, a gate 88 is shown as being hung on tubular member 10 with the lugs 14 and 28 that are unused in the fence assembly of

FIG. 8. Only the upper and lower ends of gate 88 are shown, with the middle portion broken away. A middle portion of tubular 10 is also broken away in FIG. 10. A gate bracket 90 is mounted to gate 88 more closely adjacent to its upper end than its lower end. A gate bracket 92 is mounted to gate 88 more closely adjacent to its lower end than its upper end. An apertured hinge bracket 94 is received over one of lugs 14 so that the apertures of hinge bracket 94 are aligned with the apertures of lug 14. A bolt 96 is received through the aligned apertures and secured in place with a nut (not visible in FIG. 10) to thereby fixedly but removably connect hinge bracket 94 to lug 14. Hinge bracket 94 has a stud 98 transversely extending from the free end of the hinge bracket. As shown (with a portion of one wall of hinge bracket 94 broken away), one end of stud 98 is received in hinge bracket 94 and is further integrally connected to the interior surface thereof. Stud 98 is received through a portion of gate bracket 90 to provide a pivotal connection to the gate bracket. A hinge bracket 100, similar in structure to hinge bracket 94 but oppositely oriented, is fixedly but removably connected to one of lugs 28 with a bolt 102, and has a stud 104 received through a portion of gate bracket 92 to pivotally connect hinge bracket 100 to the gate bracket. The other lugs 14 and 28 are removably connected to ends of braces 44c and 44d, respectively, with associated connectors in the manner previously described.

Obviously, many modifications and variations of the present invention are possible in light of the above teachings. For example, only one connector at one end of a brace could have an elongated end portion that is threaded, whereas the connector at the other end of the brace could be connected to that end with a swivel to allow free rotation. Or, each of the connectors at respective ends of a brace could have an elongated end portion that is unthreaded but telescopically received by an end of the brace to thereby enable longitudinal adjustment. It is, therefore, to be understood that within the scope of the appended claims the invention can be practiced otherwise than as specifically described.